

67-200-557

2001-0179

What is claimed is:

1. A cathode contact pin for making electrically conductive contact with a conductive area for carrying out an electrodeposition process comprising:

a stem region disposed adjacent a tip region said stem region for interfacing with an electrical source of power for carrying electrical power to said tip region said tip region having a radius of curvature forming a tip region contact surface for contacting a metal contact pad region such that upon contact a contacting portion of the tip region contact surface is confined within an area defined by the metal contact pad region.

2. The cathode contact pin of claim 1, wherein the stem region cross section comprises a round or polygonal shape.
3. The cathode contact pin of claim 1, wherein the stem region has an outer diameter that is within a range from about one half a tip region radius to about four times a tip region radius.

67-200-557

2001-0179

4. The cathode contact pin of claim 3, wherein a tapered transition region connects the stem region to the tip region.

5. The cathode contact pin of claim 1, wherein the radius of curvature along the tip region contact surface varies to form an ellipsoid shape.

6. The cathode contact pin of claim 1, wherein the metal contact pad region includes a rectangular area from about 50 microns to about 200 microns on a side.

7. The cathode contact pin of claim 1, wherein the stem region and tip region include at least one of aluminum, copper, palladium, nickel, gold, silver, rhodium and iridium.

8. The cathode contact pin of claim 1, wherein the metal contact pad region comprises a metal layer overlying at least an insulating layer.

67-200-557  
2001-0179

9. The cathode contact pin of claim 7, wherein the at least an insulating layer includes a plurality of metal filled openings including at least one of vias and trench lines.

10. The cathode contact pin of claim 8, wherein the metal layer and the plurality of metal filled openings include copper or an alloy thereof.

11. A cathode contact pin for making electrically conductive contact with a conductive area on a semiconductor wafer surface for carrying out an electrodeposition process comprising:

a stem region adjacent a tip region said stem region for interfacing with an electrical source of power for carrying electrical power to said tip region said tip region having a radius of curvature forming a tip region contact surface for contacting a metal contact pad region disposed at the periphery of a semiconductor wafer said metal contact pad region including a metal layer overlying at least an insulating layer.

67-200-557  
2001-0179

12. The cathode contact pin of claim 11, wherein the stem region adjacent the tip region has an outer diameter that is within a range from about one half a tip region radius to about four times a tip region radius.

13. The cathode contact pin of claim 12, wherein a tapered transition region connects the stem region to the tip region.

14. The cathode contact pin of claim 11, wherein the radius of curvature along the tip region contact surface varies to form an ellipsoid shape.

15. The cathode contact pin of claim 11, wherein the stem region cross section comprises at least one of a round or polygonal shape.

16. The cathode contact pin of claim 11, wherein the tip region has a radius of from about 50 microns to about 200 microns.

67-200-557  
2001-0179

17. The cathode contact pin of claim 11, wherein the stem region and tip region include at least one of aluminum, copper, palladium, nickel, gold, silver, rhodium and iridium.

18. The cathode contact pin of claim 11, wherein the metal contact pad region is in electrical communication with a central portion of a semiconductor wafer including a metal seed layer.

19. The cathode contact pin of claim 11, wherein the at least an insulating layer includes a plurality of metal filled openings including at least one of vias and trench lines.

20. The cathode contact pin of claim 11, wherein the at least an insulating layer comprises a material with a dielectric constant of at most about 3.0.